

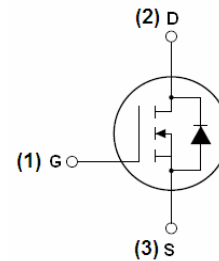
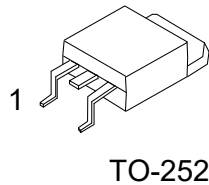
Features

- Advanced Trench Process Technology
- Low RDS(ON) to Minimize Conduction Losses
- Low Qg and Capacitance to Minimize Driver Losses
- Superior thermal resistance
- Excellent Gate Charge x RDS(ON) Product (FOM)
- Fully Characterized Capacitance and Avalanche SOA
- Pb-free lead plating; RoHS Compliant
- Halogen-free According to IEC61249-2-21



Product Summary

V_{DS}	40	V
$R_{DS(on),Max} @ V_{GS}=10\text{ V}$	2.1	m Ω
I_D	100	A



Absolute Maximum Ratings ($T_J = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Value	Unit	
V_{DS}	Drain-Source Voltage	40	V	
V_{GS}	Gate-Source Voltage	± 20	V	
I_D	Drain Current-Continuous	$T_C = 25^\circ\text{C}$	100	A
I_D		$T_C = 100^\circ\text{C}$	57	A
I_{DM}	Drain Current-Pulsed ^{Note A}	$T_C = 25^\circ\text{C}$	400	A
I_{AS}	Non-repetitive Avalanche Current ^{Note C, E}		70	A
E_{AS}	Single Pulse Drain-to-Source Avalanche Energy ^{Note C, D}		245	mJ
P_{tot}	Maximum Power Dissipation	$T_C = 25^\circ\text{C}$	35.7	W
T_J, T_{STG}	Operating and Storage Temperature Range	IEC climatic category; DIN IEC 68-1: 55/150/56	-55 to +150	$^\circ\text{C}$

Thermal Resistance Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$R_{\theta JA}$	Junction-to-Ambient ^{Note B}	Steady State	-	-	62	$^\circ\text{C}/\text{W}$
$R_{\theta JS}$	Junction-to-Soldering Point	Steady State	-	-	4	$^\circ\text{C}/\text{W}$

Notes:

- Repetitive rating, pulse width limited by junction temperature $T_{Jmax} = +150^\circ\text{C}$. Ratings are based on low frequency and duty cycles to keep initial $T_J = +25^\circ\text{C}$.
- $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. $R_{\theta JS}$ is guaranteed by design while $R_{\theta CA}$ is determined by the user's board design. $R_{\theta JA}$ shown below for single device operation on FR-4 in still air.
- Limited by T_{Jmax} , starting $T_J = +25^\circ\text{C}$, $L = 0.1\text{mH}$, $R_g = 50\Omega$, $V_{GS} = 10\text{V}$.
- I_{AS} and E_{AS} ratings are based on low frequency and duty cycles to keep $T_J = +25^\circ\text{C}$.
- Guaranteed by design. Not subject to product testing.
- Repetitive Avalanche Current Starting $T_J = +25^\circ\text{C}$, $L = 0.1\text{mH}$, $I_{AS} = 40\text{A}$, $V_{GS} = 10\text{V}$, $V_{DD} = 25\text{V}$

Electrical Characteristics (T_J=25°C unless otherwise noted)
STATIC CHARACTERISTICS

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0V, I _{DS} = 10mA	40	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 32V, V _{GS} = 0V	-	-	1	μA
		V _{DS} = 32V, V _{GS} = 0V, T _J = 125°C	-	-	100	μA
I _{GSS}	Gate-Body Leakage	V _{GS} = ±20V, V _{DS} = 0V	-	-	±100	nA

STATIC CHARACTERISTICS

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V _{GS(TH)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _{DS} = 250μA	1.2	-	2.3	V
R _{DS(ON)}	Drain-Source On-State Resistance ^{Note A}	V _{GS} = 10V, I _{DS} = 23A	-	-	2.1	mΩ
R _{DS(ON)}	Drain-Source On-State Resistance ^{Note A}	V _{GS} = 4.5V, I _{DS} = 15A	-	-	2.6	mΩ
R _g	Gate Resistance ^{Note E}	V _{GS} = 0V, V _{DS} = 0V, f = 1MHz	-	0.7	-	Ω
g _{fs}	Forward Transconductance	V _{DS} = 5V, I _{DS} = 5A	-	50	-	S

DYNAMIC CHARACTERISTICS ^{Note E}

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
C _{iss}	Input Capacitance	V _{DS} = 20V, V _{GS} = 0V, f = 1MHz	-	2940	-	pF
C _{oss}	Output Capacitance	V _{DS} = 20V, V _{GS} = 0V, f = 1MHz	-	628	-	pF
C _{rss}	Reverse Transfer Capacitance	V _{DS} = 20V, V _{GS} = 0V, f = 1MHz	-	34	-	pF
T _{d(on)}	Turn-On Delay Time	V _{DS} = 20V, V _{GS} = 10V, I _{DS} = 23A, R _{GEN} = 3.3Ω	-	18.6	-	ns
t _r	Rise Time	V _{DS} = 20V, V _{GS} = 10V, I _{DS} = 23A, R _{GEN} = 3.3Ω	-	45.8	-	ns
T _{d(off)}	Turn-Off Delay Time	V _{DS} = 20V, V _{GS} = 10V, I _{DS} = 23A, R _{GEN} = 3.3Ω	-	16.6	-	ns
t _f	Fall Time	V _{DS} = 20V, V _{GS} = 10V, I _{DS} = 23A, R _{GEN} = 3.3Ω	-	7.8	-	ns

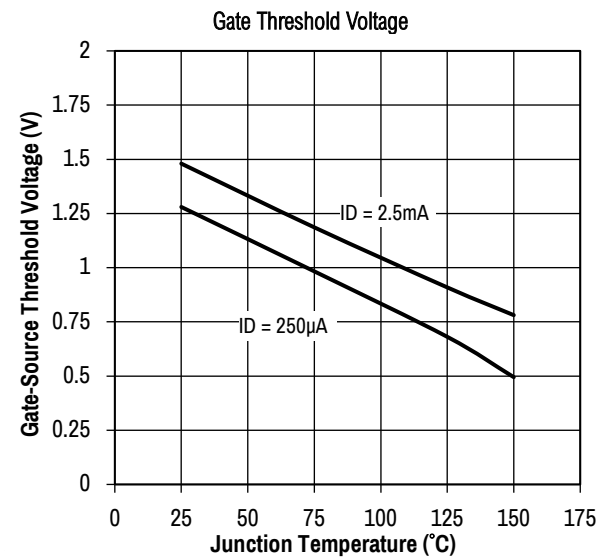
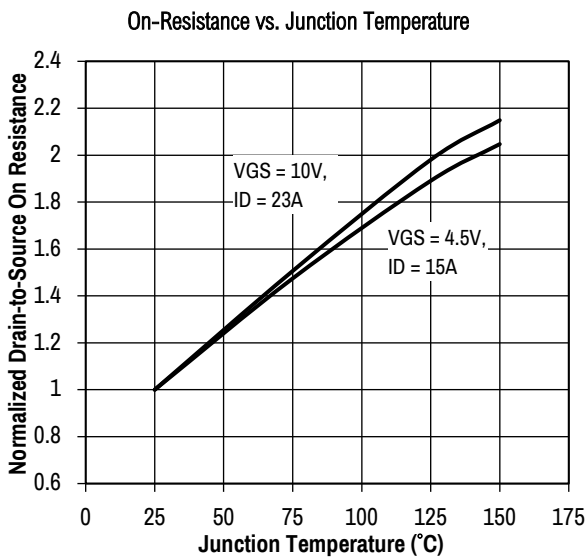
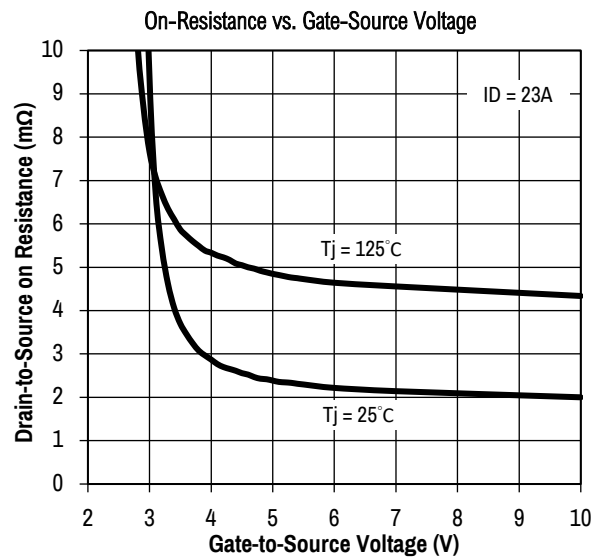
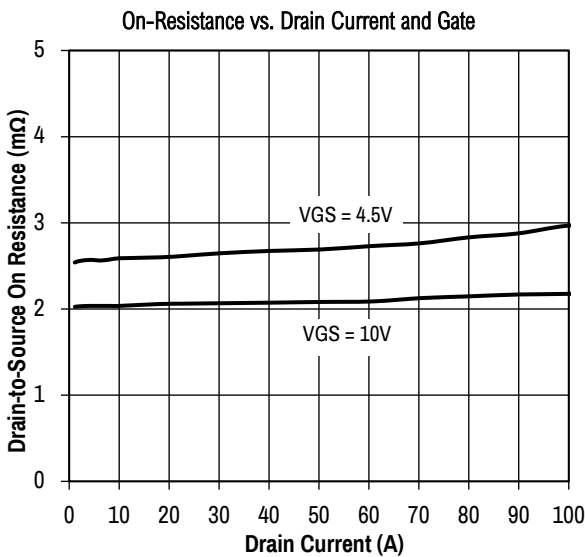
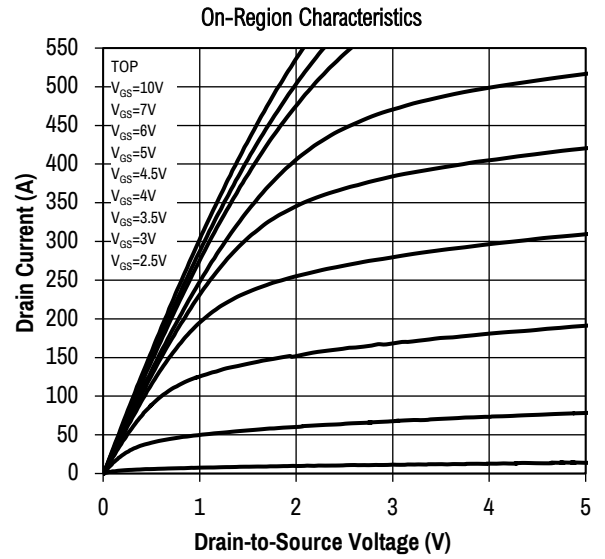
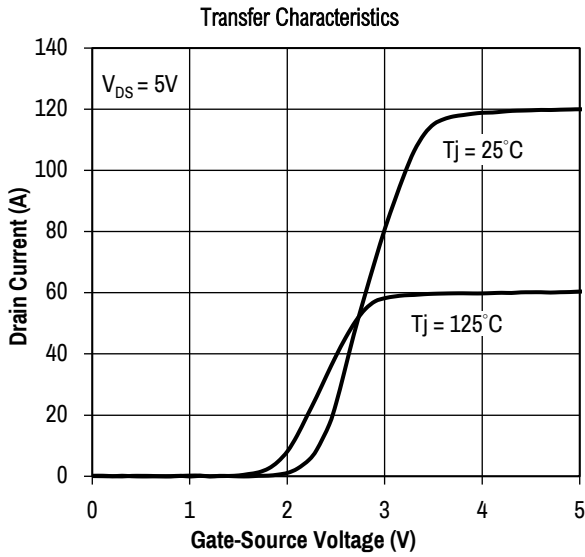
GATE CHARGE CHARACTERISTICS ^{Note E}

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q _{gs}	Gate to Source Gate Charge	V _{DD} = 20V, I _D = 23A, V _{GS} = 0 to 10V	-	9	-	nC
Q _{g(th)}	Gate charge at threshold	V _{DD} = 20V, I _D = 23A, V _{GS} = 0 to 10V	-	5.9	-	nC
Q _{gd}	Gate to Drain Charge	V _{DD} = 20V, I _D = 23A, V _{GS} = 0 to 10V	-	6.6	-	nC
Q _{sw}	Switching charge	V _{DD} = 20V, I _D = 23A, V _{GS} = 0 to 10V	-	9.6	-	nC
Q _g	Gate charge total	V _{DD} = 20V, I _D = 23A, V _{GS} = 0 to 10V	-	45.5	-	nC
Q _g	Gate charge total	V _{DD} = 20V, I _D = 23A, V _{GS} = 0 to 4.5V	-	21.2	-	nC
V _{plateau}	Gate plateau voltage	V _{DD} = 20V, I _D = 23A, V _{GS} = 0 to 10V	-	3.1	-	V
Q _{g(sync)}	Gate charge total, sync. FET (Q _g - Q _{gd})	V _{DS} = 0.1V, V _{GS} = 0 to 10V	-	38.9	-	nC

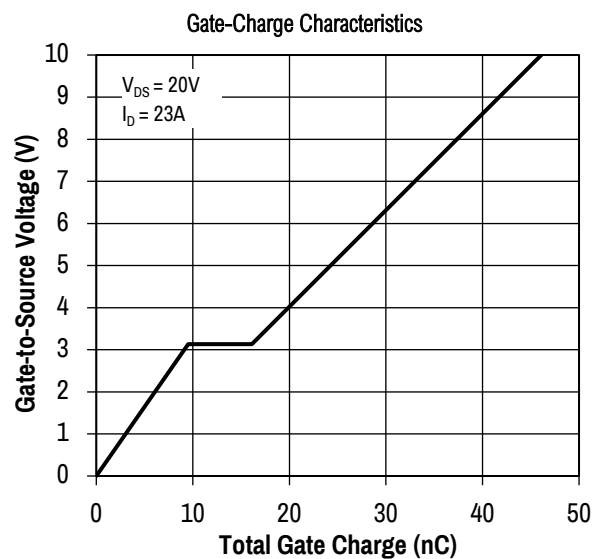
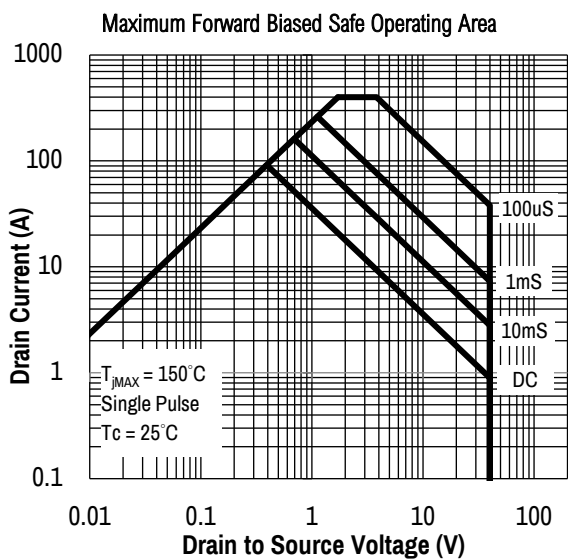
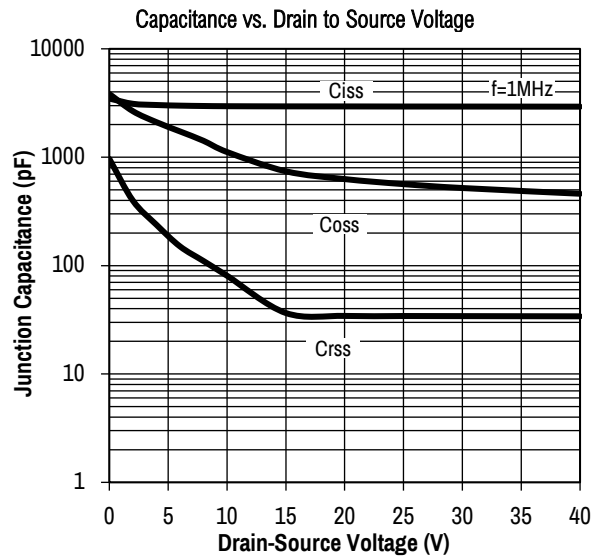
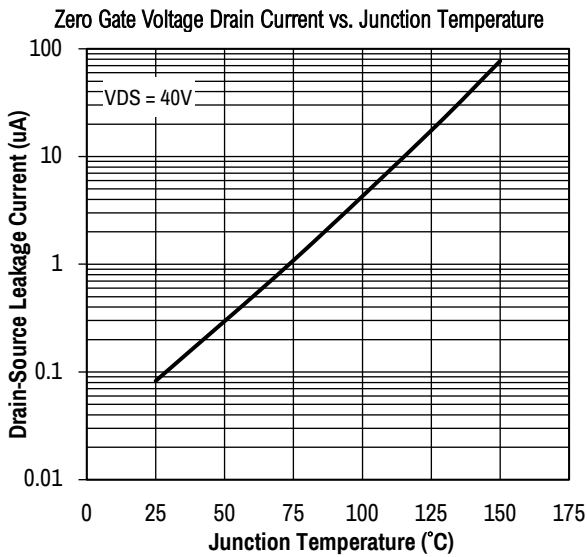
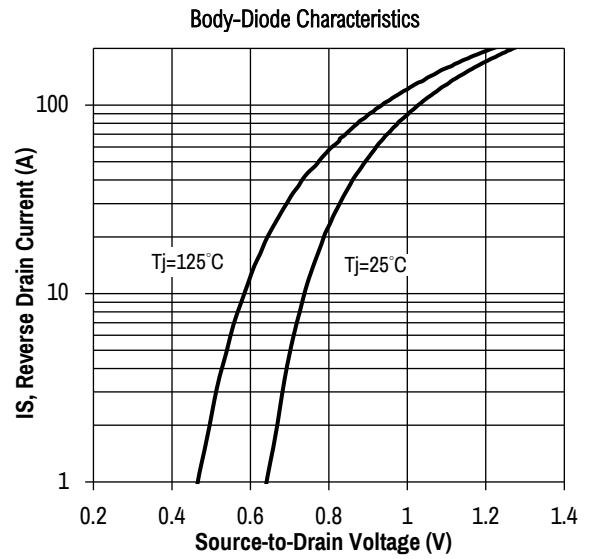
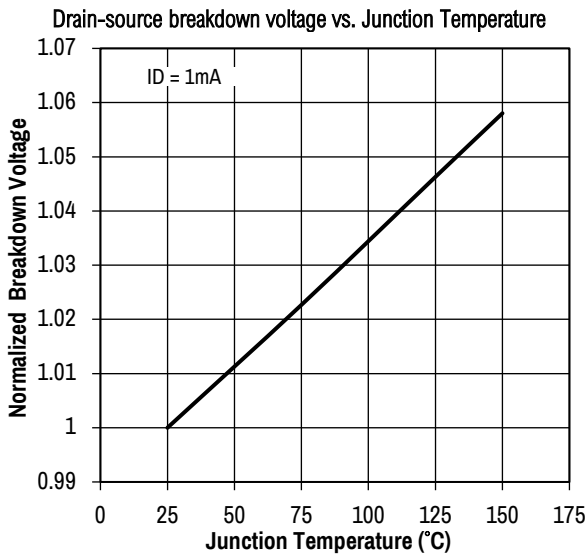
REVERSE DIODE

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _S	Diode continuous forward current	T _C = 25°C	-	-	100	A
I _{SM}	Diode pulse current	T _C = 25°C	-	-	400	A
V _{SD}	Diode Forward Voltage ^{Note A}	V _{GS} = 0V, I _F = 23A	-	-	1.2	V
t _{rr}	Body Diode Reverse Recovery Time ^{Note E}	V _{DD} = 20V, I _F = 23A, di/dt = 100A/μs	-	24.4	-	ns
Q _{rr}	Body Diode Reverse Recovery Charge ^{Note E}	V _{DD} = 20V, I _F = 23A, di/dt = 100A/μs	-	16.1	-	nC

Typical Operating Characteristics

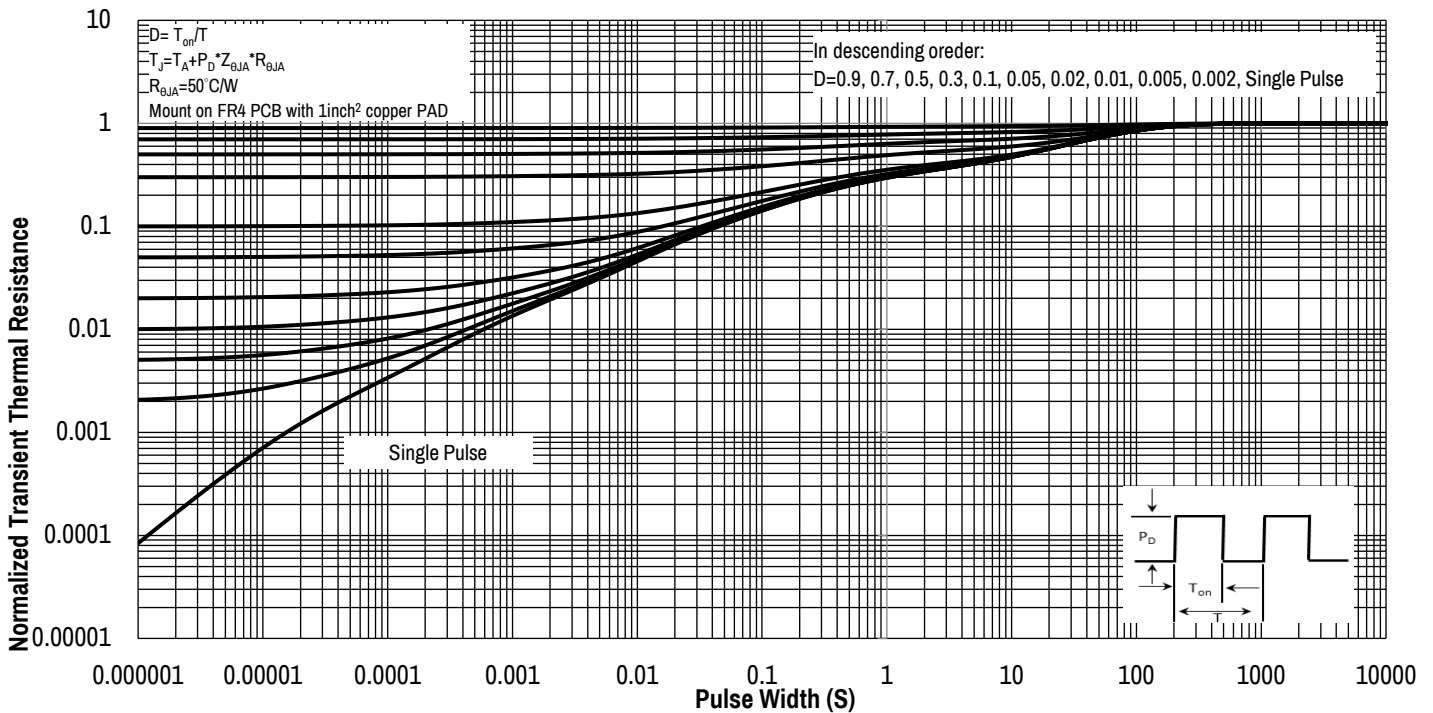
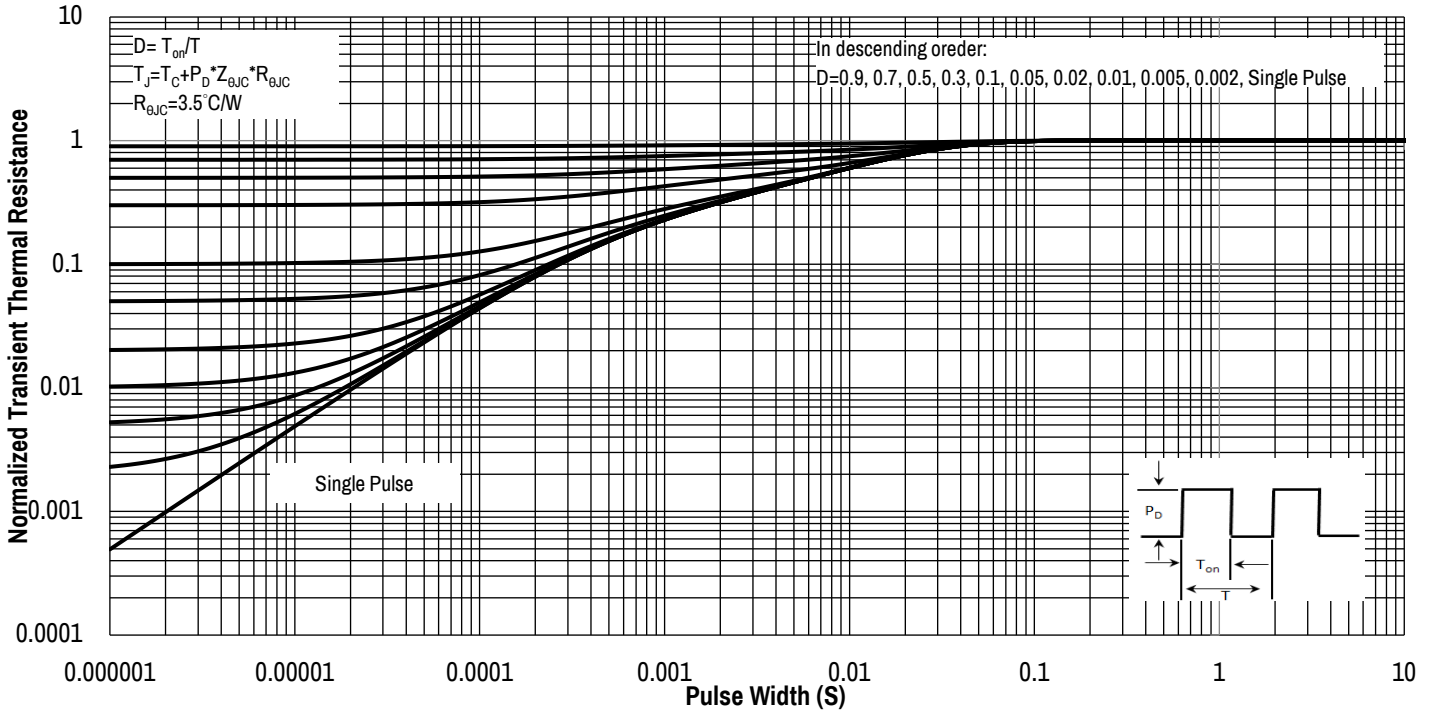


Typical Operating Characteristics (Cont.)



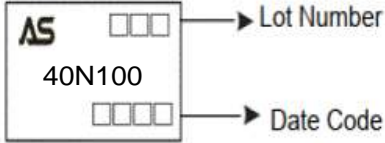
Typical Operating Characteristics (Cont.)

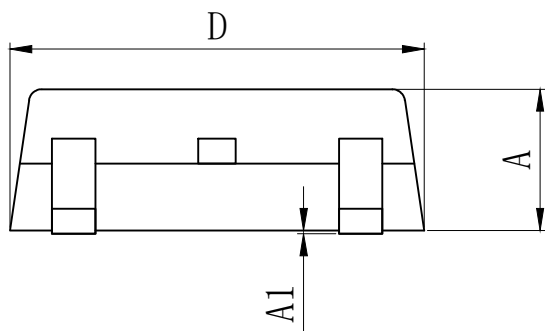
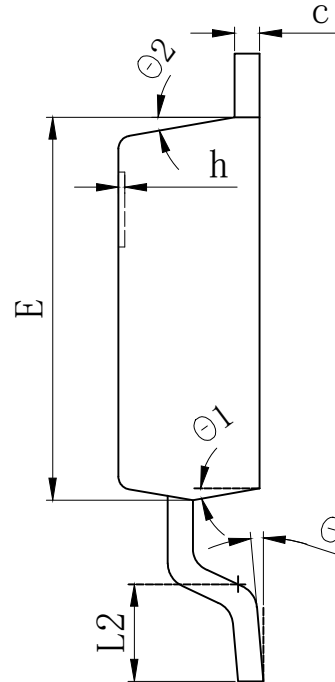
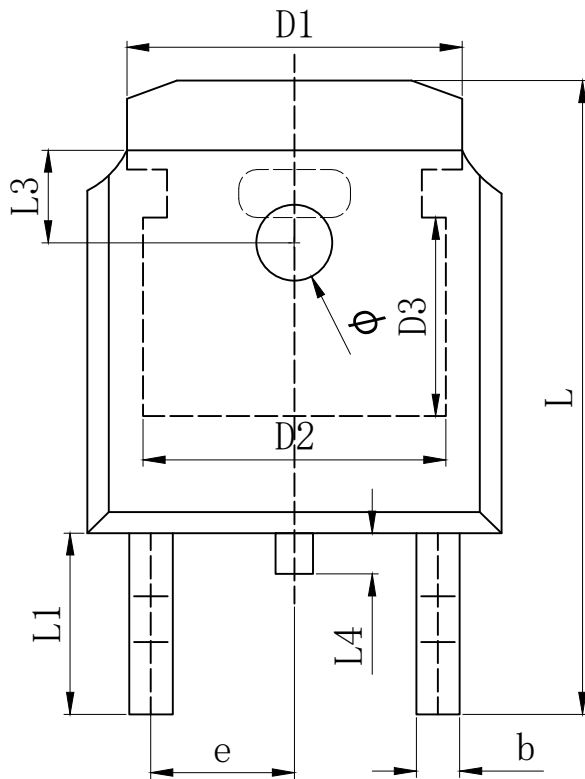
Transient Thermal Resistance



Ordering and Marking Information

Ordering Device No.	Marking	Package	Packing	Quantity
ASDM40N100KQ-R	40N100	TO-252	Tape&Reel	2500/Reel

PACKAGE	MARKING
TO-252	 <p>AS □□□ → Lot Number 40N100 □□□□ → Date Code</p>



SYMBOL	MILLIMETER		
	MIN	Typ.	MAX
A	2.200	2.300	2.400
A1	0.000		0.127
b	0.640	0.690	0.740
c (电镀后)	0.460	0.520	0.580
D	6.500	6.600	6.700
D1	5.334 REF		
D2	4.826 REF		
D3	3.166 REF		
E	6.000	6.100	6.200
e	2.286 TYP		
h	0.000	0.100	0.200
L	9.900	10.100	10.300
L1	2.888 REF		
L2	1.400	1.550	1.700
L3	1.600 REF		
L4	0.600	0.800	1.000
ϕ	1.100	1.200	1.300
θ	0°		8°
$\theta 1$	9° TYP		
$\theta 2$	9° TYP		

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