

- ★ Green Device Available
- ★ Super Low Gate Charge
- ★ Excellent CdV/dt effect decline
- ★ Advanced high cell density Trench technology
- ★ 100% EAS Guaranteed

Product Summary

RoHS

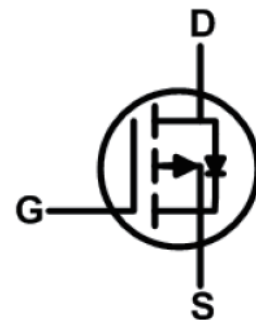
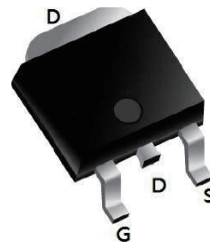
BVDSS	RDSON	ID
-100V	80mΩ	-20A

Description

The 20P10 is the high cell density trenched N-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

The 20P10 meet the RoHS and Green Product, requirement 100% EAS guaranteed with full function reliability approved.

TO252 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Max.	Unit
V <sub>DSS</sub>	Drain-Source Voltage	-100	V
V <sub>GSS</sub>	Gate-Source Voltage	±20	V
I <sub>D</sub>	Continuous Drain Current	T <sub>c</sub> = 25°C	-20
		T <sub>c</sub> = 100°C	-11
I <sub>DM</sub>	Pulsed Drain Current <small>note1</small>	-72	A
EAS	Single Pulsed Avalanche Energy <small>note2</small>	132.25	mJ
P <sub>D</sub>	Power Dissipation	T <sub>c</sub> = 25°C	70
R <sub>θJC</sub>	Thermal Resistance, Junction to Case	1.78	°C/W
R <sub>θJA</sub>	Thermal Resistance Junction-Ambient 1	75	°C/W
T <sub>J</sub> , T <sub>STG</sub>	Operating and Storage Temperature Range	-55 to 150	°C

**Electrical Characteristics ( $T_J = 25^\circ\text{C}$  unless otherwise specified)**

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Units
<b>Static Characteristics</b>						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = -250\mu A$	-100	-	-	V
$I_{GSS}$	Gate-Body Leakage Current	$V_{DS} = 0V, V_{GS} = \pm 20V$	-	-	$\pm 100$	nA
$I_{DSS}$	Zero Gate Voltage Drain Current	$T_J = 25^\circ\text{C}$	-	-	-100	$\mu A$
		$T_J = 100^\circ\text{C}$	-	-	-1	
$V_{GS(th)}$	Gate-Threshold Voltage	$V_{DS} = V_{GS}, I_D = -250\mu A$	-1	-1.8	-2.5	V
$R_{DS(on)}$	Drain-Source on-Resistance <sup>4</sup>	$V_{GS} = -10V, I_D = -10A$	-	80	100	m $\Omega$
		$V_{GS} = -4.5V, I_D = -6A$	-	88	120	
$g_{fs}$	Forward Transconductance <sup>4</sup>	$V_{DS} = -10V, I_D = -10A$	-	30	-	S
<b>Dynamic Characteristics<sup>5</sup></b>						
$C_{iss}$	Input Capacitance	$V_{DS} = -50V, V_{GS} = 0V,$ $f = 1\text{MHz}$	-	3985	-	pF
$C_{oss}$	Output Capacitance		-	85	-	
$C_{rss}$	Reverse Transfer Capacitance		-	71	-	
$R_G$	Gate Resistance	$f = 1\text{MHz}$	-	4	-	$\Omega$
<b>Switching Characteristics<sup>5</sup></b>						
$Q_g$	Total Gate Charge	$V_{GS} = -10V, V_{DD} = -50V, I_D = -10A$	-	65	-	nC
$Q_{gs}$	Gate-Source Charge		-	10.2	-	
$Q_{gd}$	Gate-Drain Charge		-	13	-	
$t_{d(on)}$	Turn-on Delay Time	$V_{GS} = -10V, V_{DD} = -50V, R_G = 3\Omega,$ $I_D = -10A$	-	12.8	-	ns
$t_r$	Rise Time		-	30	-	
$t_{d(off)}$	Turn-off Delay Time		-	82	-	
$t_f$	Fall Time		-	61	-	
$t_{rr}$	Body Diode Reverse Recovery Time		-	62	-	
$Q_{rr}$	Body Diode Reverse Recovery Charge	$I_F = -10A, dI_F/dt = 100A/\mu s$	-	56	-	nC
<b>Drain-Source Body Diode Characteristics</b>						
$V_{SD}$	Diode Forward Voltage <sup>4</sup>	$I_S = -10A, V_{GS} = 0V$	-	-	-1.2	V
$I_S$	Continuous Source Current	$T_C = 25^\circ\text{C}$	-	-	-20	A

**Note :**

1. Repetitive rating, pulse width limited by junction temperature  $T_{J(MAX)} = 150^\circ\text{C}$ .
2. The EAS data shows Max. rating . The test condition is  $V_{DD} = -35V, V_{GS} = -10V, L = 0.5\text{mH}, I_{AS} = -23A$
3. The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper, The value in any given application depends on the user's specific board design.
4. The data tested by pulsed , pulse width  $\leq 300\mu s$  , duty cycle  $\leq 2\%$ .
5. This value is guaranteed by design hence it is not included in the production test..

P-Channel Typical Characteristics

Figure 1: Output Characteristics

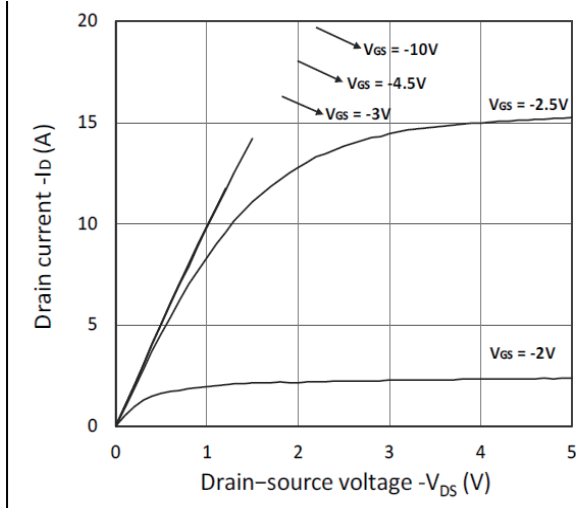


Figure 2: On-Resistance vs. G-S Voltage

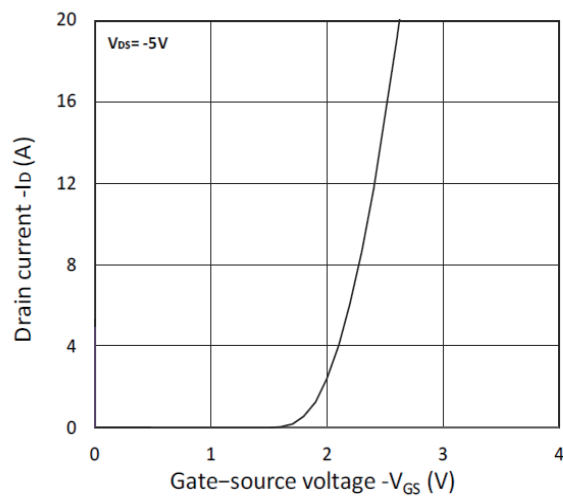


Figure 3: Forward Characteristics Of Reverse

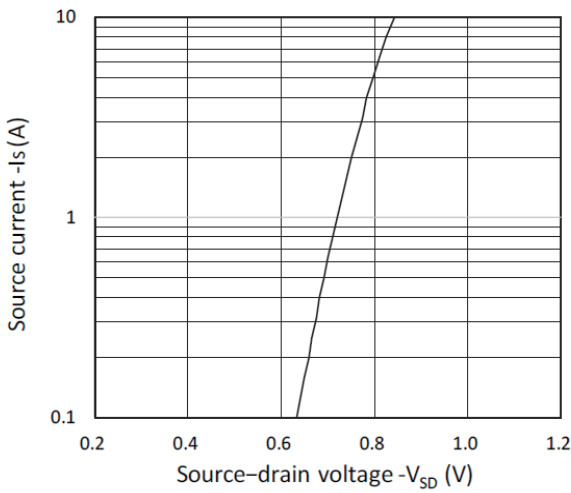


Figure 4: Gate-Charge Characteristics

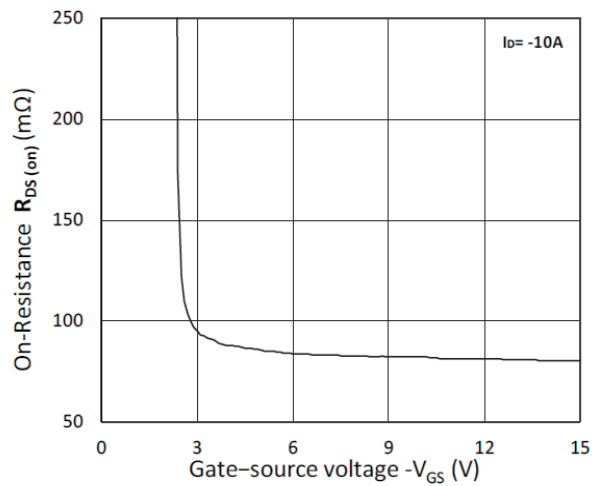


Figure 5: Normalized VGS(th) vs. T\_J

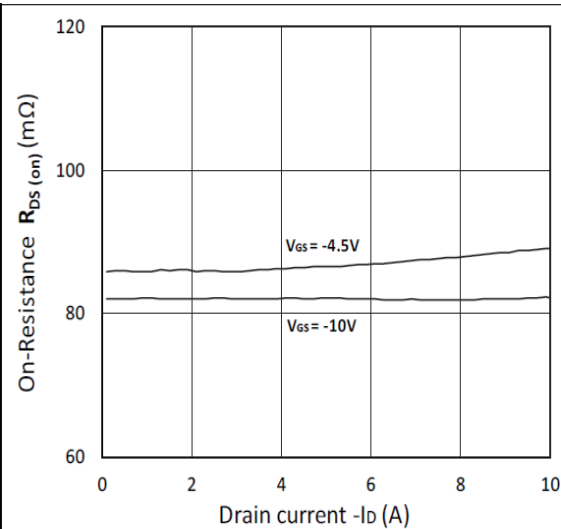
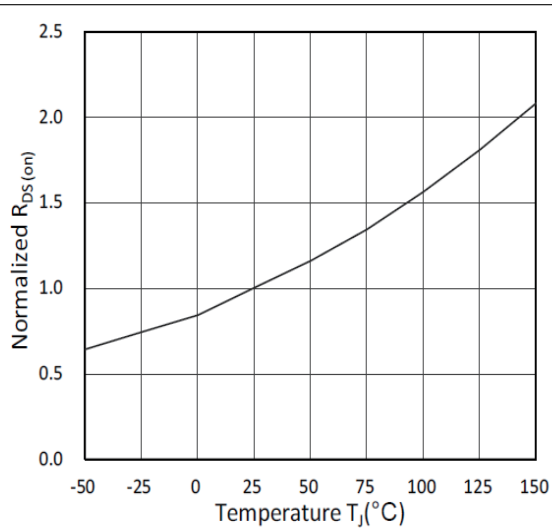


Figure 6: Normalized R\_DS(on) vs. T\_J



Typical Performance Characteristics

Figure 7: Capacitance Characteristics

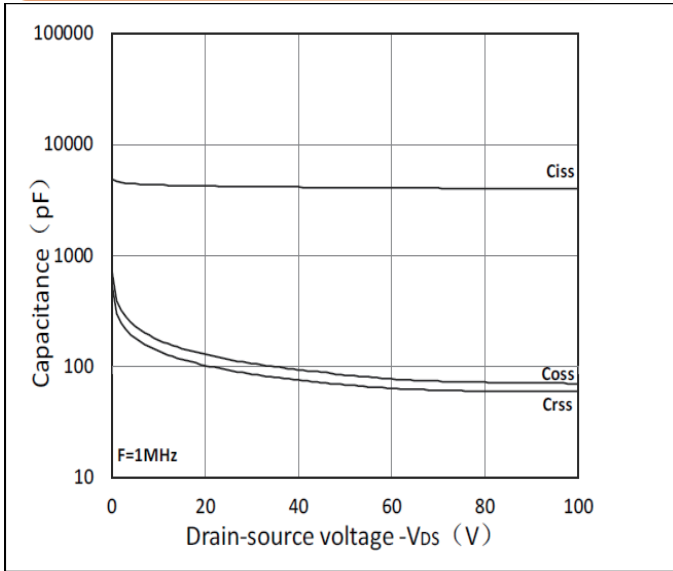


Figure 8: Gate Charge Characteristics

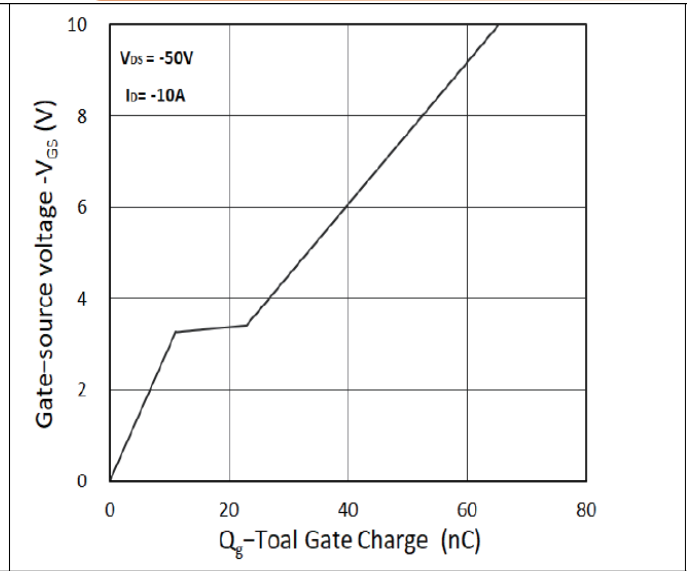


Figure 9: Power Dissipation

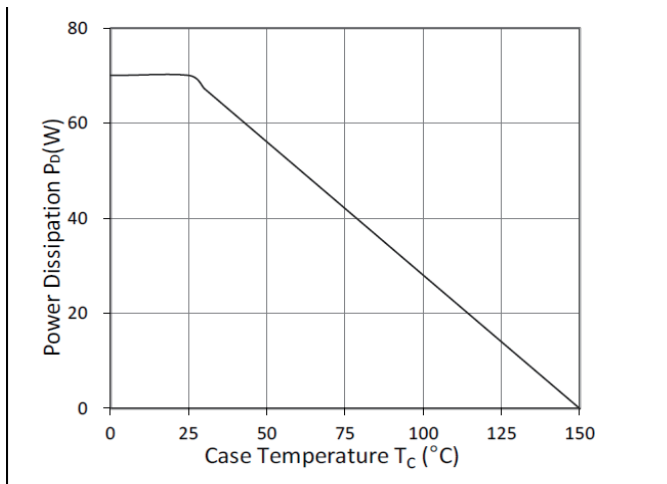


Figure 10: Safe Operating Area

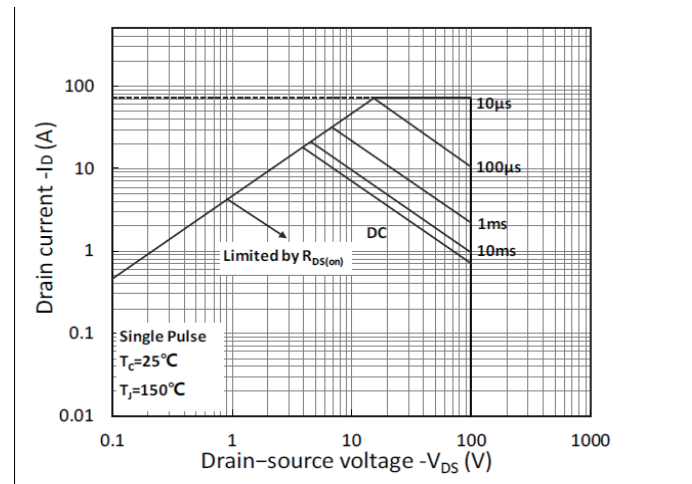
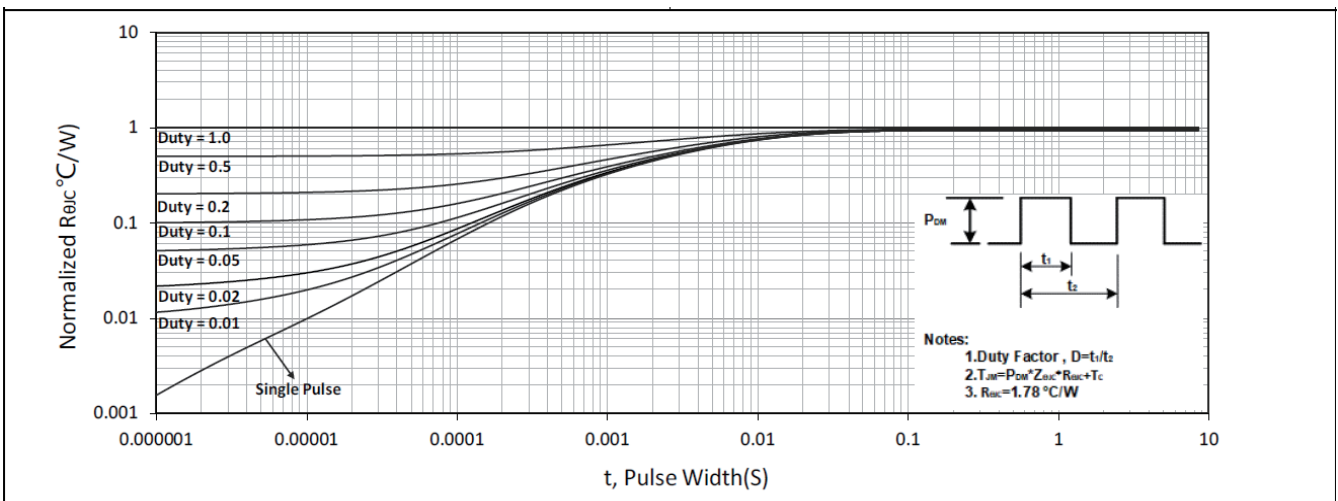
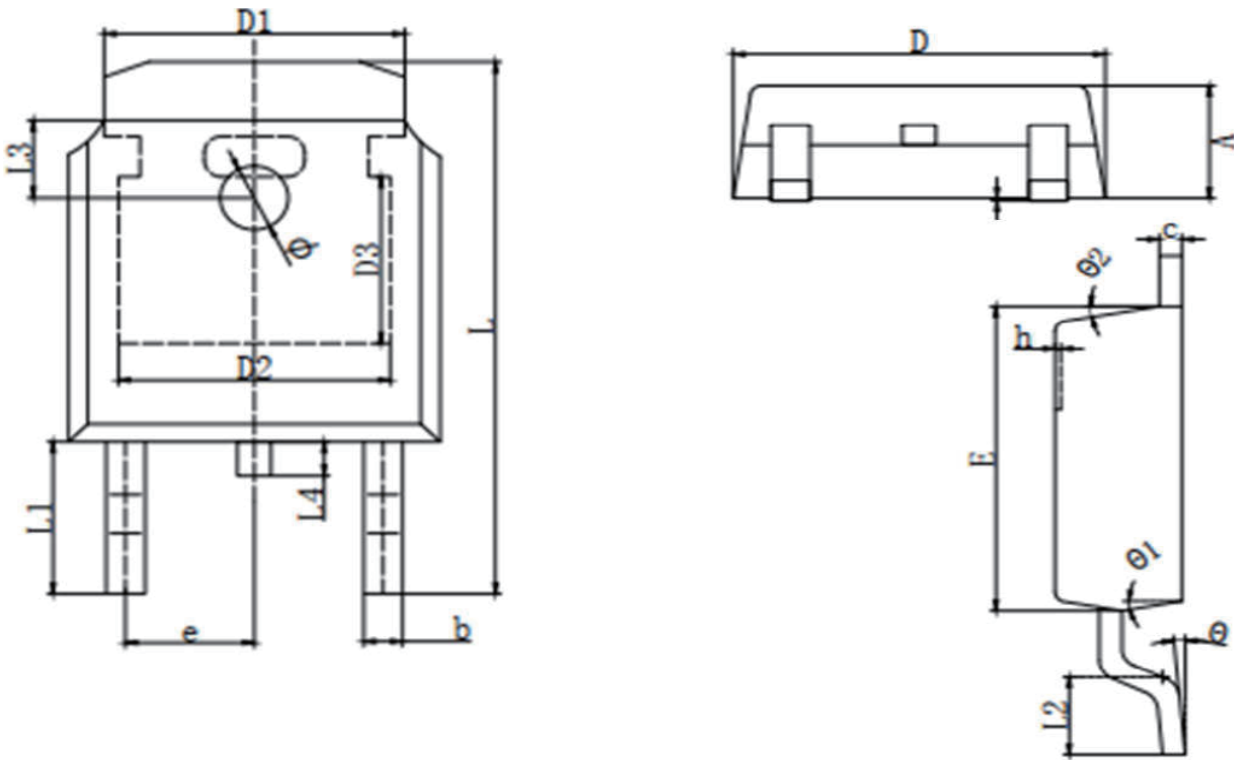


Figure 11: Normalized Maximum Transient Thermal Impedance



TO-252 Package outline



Symbol	MILLMETER		Symbol	MILLMETER	
	MIN	MAX		MIN	MAX
A	2.200	2.400	h	0.000	0.200
A1	0.000	0.127	L	9.900	10.30
b	0.640	0.740	L1	2.888REF	
c	0.460	0.580	L2	1.400	1.700
D	6.500	6.700	L3	1.600REF	
D1	5.334REF		L4	0.600	1.000
D2	4.826REF		Ø	1.100	1.300
D3	3.166REF		θ	0°	8°
E	6.00	6.200	θ <sub>1</sub>	9° TYP2	
e	2.286TYP		θ <sub>2</sub>	9° TYP	