

## 30V N-Channel Power MOSFET

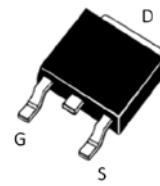
### DESCRIPTION :

- Excellent  $R_{DS(ON)}$
- Low Gate Charge
- 100% UIS Tested, 100%  $\Delta V_{DS}$  Tested
- Pb-Free Lead Plating
- RoHS compliant
- Halogen Free

$V_{DS}$	30V
$I_D @ V_{GS}=10V$	161A
$R_{DS(ON)_Typ.} @ V_{GS}=10V$	1.7m $\Omega$

### TYPICAL APPLICATIONS :

- Power Management
- Load Switch
- PWM Application



TO-252

### MAXIMUM RATINGS (at $T_C = 25^\circ C$ , unless otherwise specified)

Characteristic	Condition	Symbol	Value	Unit
Drain-Source Voltage		$V_{DS}$	30	V
Gate-Source Voltage		$V_{GS}$	$\pm 20$	V
Continuous Drain Current	$T_C=25^\circ C$ $T_C=100^\circ C$	$I_D$	161 102	A
Pulsed Drain Current <sup>(1)</sup>		$I_{DM}$	645	A
Single Pulsed Avalanche Energy <sup>(2)</sup>		$E_{AS}$	205	mJ
Power dissipation	$T_C=25^\circ C$	$P_D$	83	W
Junction & Storage temperature Range		$T_J, T_{STG}$	-55~+150	$^\circ C$

Notes : 1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.

2. This single-pulse measurement was taken under the following condition [ $L = 300 \mu H, V_{GS} = 10V, V_{DS} = 15V$ ] while its value is limited by  $T_{J\_Max} = 150^\circ C$

### THERMAL CHARACTERISTICS

Characteristic	Condition	Symbol	Value	Unit
Thermal resistance,	Junction to Ambient Junction to Case	$R_{\theta JA}$ $R_{\theta JC}$	50 1.2	$^\circ C/W$

ELECTRICAL CHARACTERISTICS (at  $T_J = 25\text{ }^\circ\text{C}$ , unless otherwise specified)

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage VGS = 0V, ID = 1mA	$V_{(BR)DSS}$	30			V
Zero Gate Voltage Drain Current VDS = 24 V, VGS = 0 V	$I_{DSS}$			1	$\mu\text{A}$
Gate-Source Leakage Current VGS = $\pm 20\text{V}$ , VDS = 0V	$I_{GSS}$			$\pm 100$	nA
Gate-Source threshold voltage VDS = VGS, ID = 250 $\mu\text{A}$	$V_{GS(th)}$	1.2	1.6	2.5	V
Drain-Source On-State Resistance VGS = 10V, ID = 20A VGS = 4.5V, ID = 15A	$R_{DS(on)}$		1.7 2.2	2.2 2.9	m $\Omega$
Gate Resistance VDS=5V, ID = 20A	$g_{FS}$		110		S
Gate Resistance f=1MHz, VDS=0 V, VGS=0 V	$R_g$		1.8		$\Omega$
Input capacitance f=1MHz, VDS=15 V, VGS=0 V	$C_{iss}$		4185		pF
Output capacitance f=1MHz, VDS=15 V, VGS=0 V	$C_{oss}$		2861		pF
Reverse transfer capacitance f=1MHz, VDS=15 V, VGS=0 V	$C_{rss}$		233		pF
Total Gate Charge VDs= 15V, ID= 20A, VGS= 10V VDs= 15V, ID= 20A, VGS= 4.5V	$Q_G$		64 31		nC
Gate to Source Charge VDs= 15V, ID= 20A, VGS= 0 to 10V	$Q_{GS}$		10.4		nC
Gate to Drain Charge VDs= 15V, ID= 20A, VGS= 0 to 10V	$Q_{GD}$		9.7		nC
Turn-on delay time VDs=15 V, VGS= 10V, RL= 0.75 $\Omega$ , RGEN=6 $\Omega$	$t_{d(ON)}$		6.2		ns
Rise time VDs=15 V, VGS= 10V, RL= 0.75 $\Omega$ , RGEN=6 $\Omega$	$t_r$		7.8		ns
Turn-off delay time VDs=15 V, VGS= 10V, RL= 0.75 $\Omega$ , RGEN=6 $\Omega$	$t_{d(OFF)}$		35		ns
Fall time VDs=15 V, VGS= 10V, RL= 0.75 $\Omega$ , RGEN=6 $\Omega$	$t_f$		20		ns

## Body Diode

ELECTRICAL CHARACTERISTICS (at  $T_J = 25\text{ }^\circ\text{C}$ , unless otherwise specified)

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Diode Forward Voltage $V_{GS} = 0V, I_S = 1A$	$V_{SD}$		0.69	1.0	V
Maximum Continuous Body Diode Forward Current	$I_S$			83	A
Revers Recovery Time $I_F = 15A, di/dt = 100A/us$	$T_{rr}$		54		ns
Revers Recovery Charge $I_F = 15A, di/dt = 100A/us$	$Q_{rr}$		60		nC

Typical Performance Characteristics

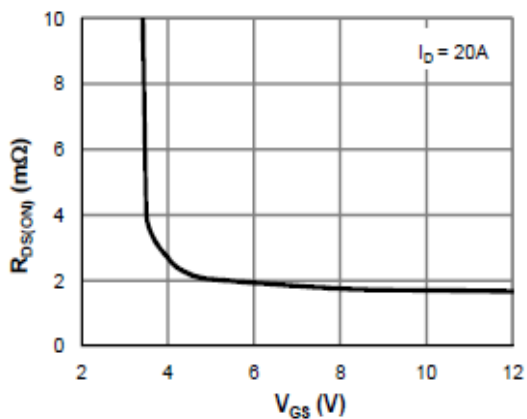


Figure 1.  $R_{DS(ON)}$  vs.  $V_{GS}$

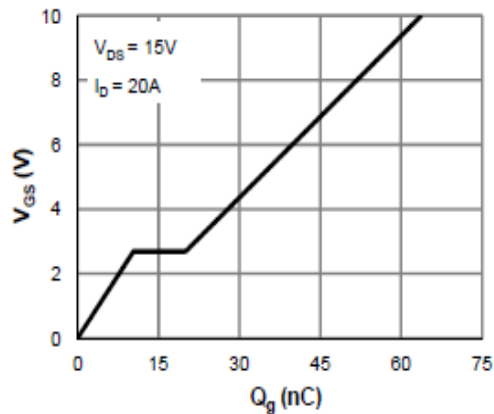


Figure 2. Gate Charge Characteristics

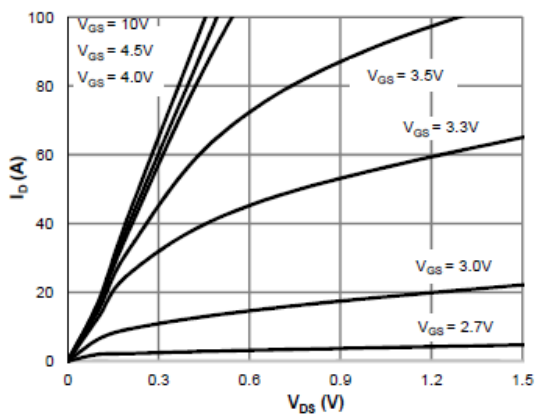


Figure 3. Saturation Characteristics

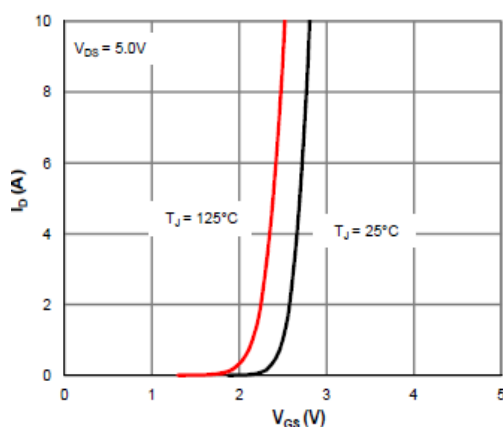


Figure 4. Transfer Characteristics

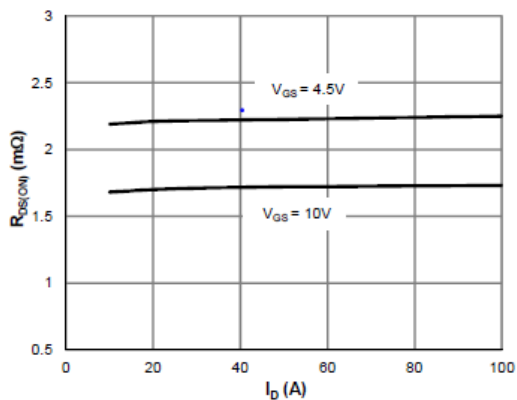


Figure 5. On-resistance vs. Drain Current

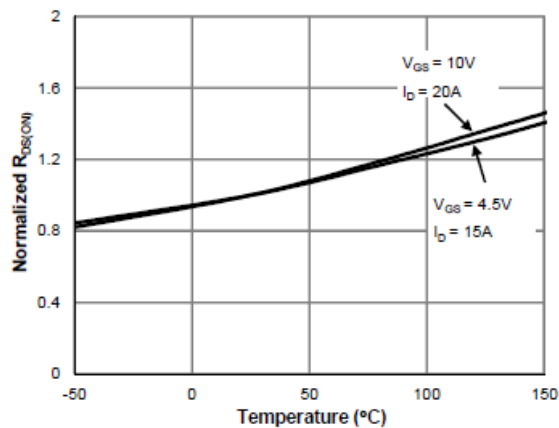


Figure 6.  $R_{DS(ON)}$  vs. Junction Temperature

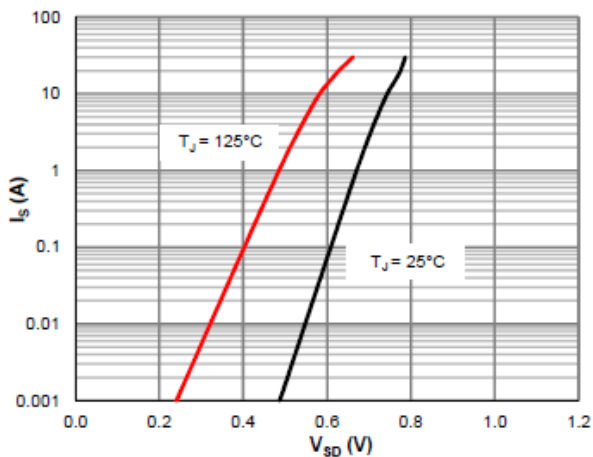


Figure 7. Body-Diode Characteristics

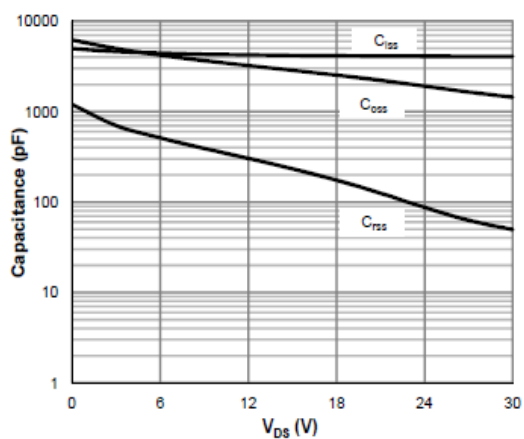


Figure 8. Capacitance Characteristics

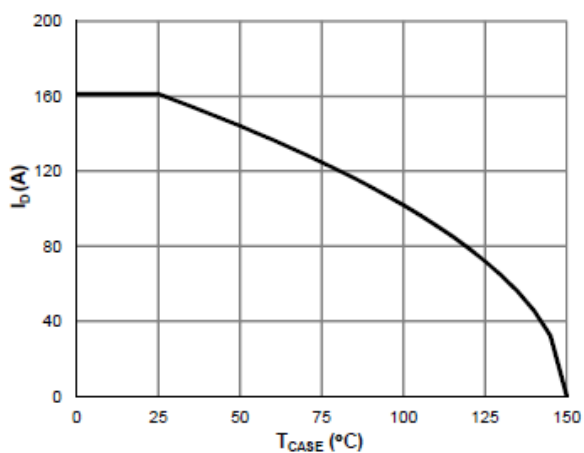


Figure 9. Current De-rating

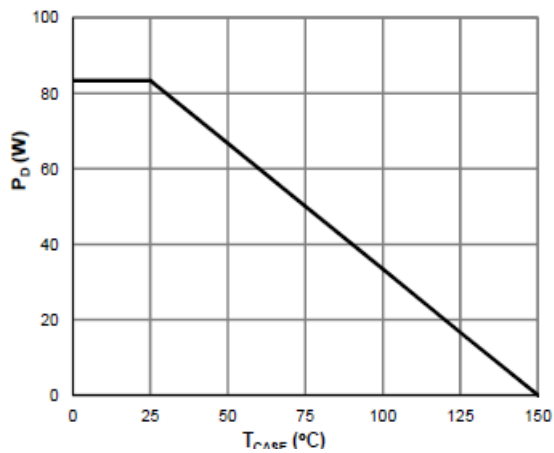


Figure 10. Power De-rating

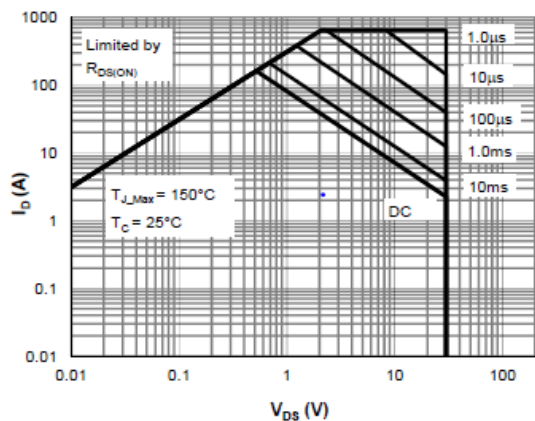


Figure 11. Single Pulse Power Rating, Junction-to-Case

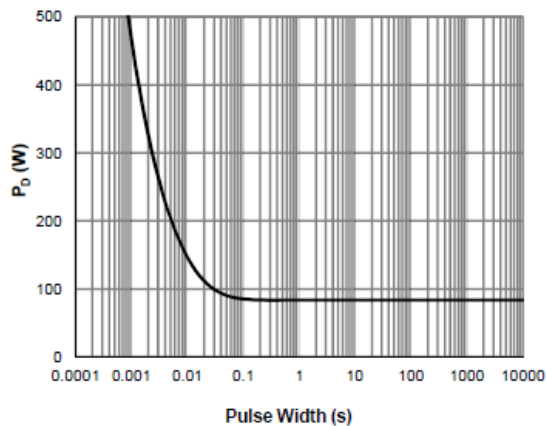


Figure 12. Maximum Safe Operating Area

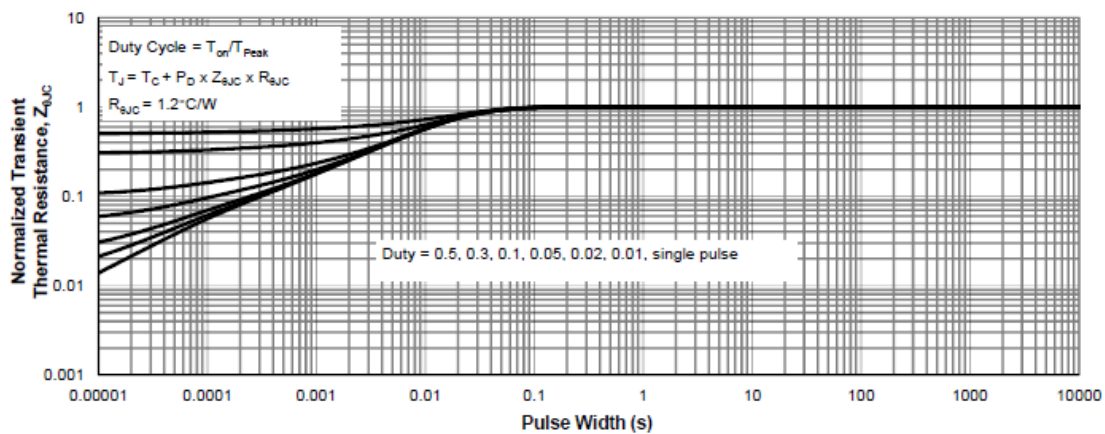
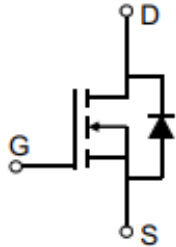


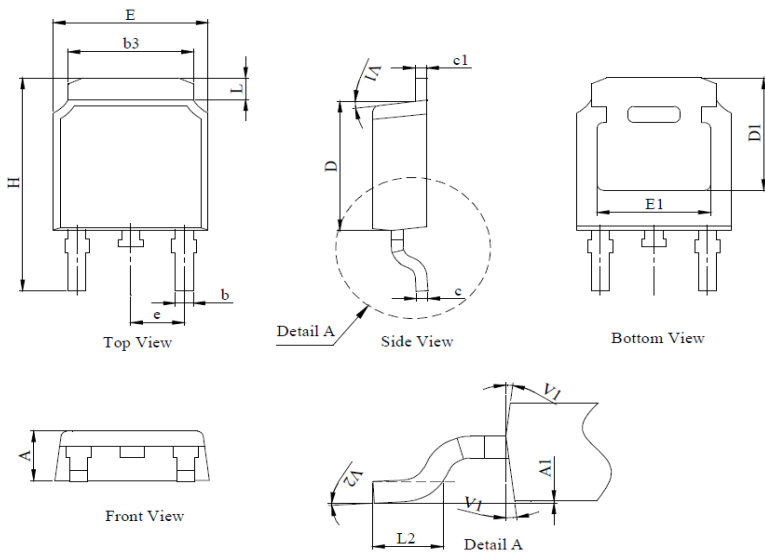
Figure 14. Normalized Maximum Transient Thermal Impedance

- Circuit diagram



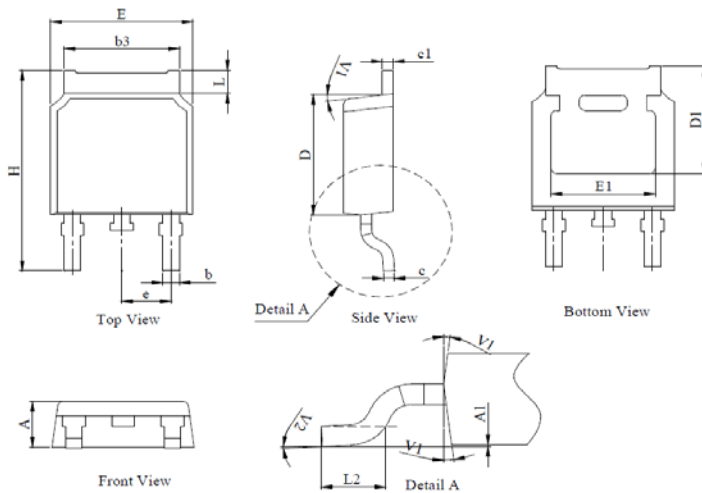
- Package outlines : Dimensions in (mm)

**Package Outline Type-A**



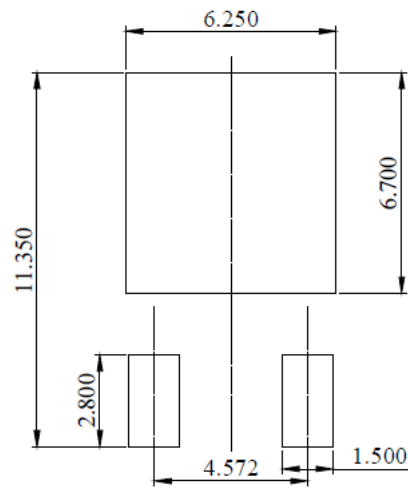
DIM.	MILLIMETER		
	MIN.	NOM.	MAX.
A	2.18	2.30	2.39
A1	0	--	0.13
b	0.64	0.76	0.89
c	0.40	0.50	0.61
c1	0.46	0.50	0.58
D	5.97	6.10	6.23
D1	5.05	--	--
E	6.35	6.60	6.73
E1	4.32	--	--
b3	5.21	5.38	5.55
e	2.29 BSC		
H	9.40	10.00	10.40
L	0.89	--	1.27
L2	1.40	--	1.78
V1	7° REF		
V2	0°	--	6°

**Package Outline Type-B**



DIM.	MILLIMETER		
	MIN.	NOM.	MAX.
A	2.10	2.30	2.40
A1	0	--	0.13
b	0.66	0.76	0.86
b3	5.21	5.38	5.55
c	0.40	0.50	0.60
c1	0.44	0.50	0.58
D	5.90	6.10	6.30
D1	5.30REF		
E	6.40	6.60	6.80
E1	4.63	-	-
e	2.29 BSC		
H	9.50	10.00	10.70
L	1.09	--	1.21
L2	1.35	--	1.65
V1	7° REF		
V2	0°	--	6°

**Recommended Soldering Footprint**



DIMENSIONS: MILLIMETERS

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